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09/787,358		Philip Marriott	14544-002001	7859

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FISH & RICHARDSON P.C.
500 ARGUELLO STREET, SUITE 500
REDWOOD CITY, CA 94063

EXAMINER
QUASH, ANTHONY G

ART UNIT	PAPER NUMBER
2881	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/787,358	Applicant(s) MARRIOTT, PHILIP	
	Examiner Anthony Quash	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eiden [091]. As per claim 1, Eiden [091] teaches a mass spectrometer comprising; means for generating ions (900) from a sample introduced into a plasma, a sampling aperture (20) for transmitting some of the ions into an evacuated expansion chamber (15) along a first axis to form an ion beam; a second aperture (3) for transmitting some of the ion beam into a first evacuated chamber, a first pump for maintaining the first evacuated chamber at high vacuum, a first ion optical device being located in the first evacuated chamber (15) for containing the ion beam wherein the first ion optical device is a mass selective device, a third aperture (40) for transmitting the ion beam into a second evacuated chamber (25) at a lower pressure than the first evacuated chamber (15); a collision cell (710) having an entrance aperture (740) and an exit aperture (770) and pressurized with a target gas, the collision cell (710) being disposed in the second evacuated chamber (25); a second ion optical device (720) located in the collision cell for containing the ion beam; and fourth aperture for transmitting the ion beam into a third evacuated chamber (35) containing mass-to-charge ratio analyzing means (10) disposed along an axis for mass analyzing the ion beam to produce a mass spectrum of the ion beam. Although Eiden [091] does not

specifically state that the mass-to-charge ratio analyzing means operate at the same mass to charge ratio, it would have been obvious to one of ordinary skill in the art at the time the invention was made to analyze the beam at the analyte mass to charge ratio in order to see a spectrum of the ions of interest. In addition, Eiden [091] teaches a third pump for maintaining the third evacuated chamber at lower pressure than the second evacuated chamber. See Eiden [091] abstract, figs. 1,3-4,7, col. 4 lines 1-20 and 34-40, col. 8 lines 24-67, col. 9 lines 1-40, col. 10 lines 25-41, col. 12 lines 25-40, col. 15 lines 15-40.

As per claim 2, Eiden [091] teaches all aspects of the claim except for the first evacuated chamber being maintained at a pressure of approximately 10^{-2} to 10^{-4} mbar. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first evacuated chamber be maintained at a pressure of approximately 10^{-2} to 10^{-4} mbar, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

As per claims 3, Eiden [091] teaches all aspects of the claim except for the first evacuated chamber being maintained at a pressure of approximately 1-2 x 10^{-3} mbar. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first evacuated chamber be maintained at a pressure of approximately 1-2 x 10^{-4} mbar, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claims 4, Eiden [091] teaches the ion beam, resulting from transmitting some of the ions from the ion source through a sampling aperture (20) into an evacuated expansion chamber (15) along a first axis, being transmitted into the first evacuated chamber through a second aperture, and into the second evacuated chamber (25) through a third aperture, and wherein a gap is maintained between the third aperture and an entrance aperture of the collision cell (710). See Eiden [091] figs. 1,3-4, and 7. However, it does not specifically state that the gap be at least 2 cm. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the gap be at least 2 cm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

As per claim 5, Eiden [091] teaches a distance being maintained between the ion source and an entrance aperture of the collision cell. See Eiden [091] fig. 7 and col. 8 lines 25-67 and col. 9 lines 1-40. However, it does not specifically state that the distance maintained should be 90 to 200 mm. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a distance of 90 to 200 mm be maintained between the ion source and an entrance aperture of the collision cell, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

As per claim 13, Eiden [091] teaches a method of operating an mass spectrometer that incorporates a collision cell pressurized with a target gas, the method

comprising; generating, from an ion source, an ion beam including analyte ions and artifact ions, mass selecting at least a portion of the ion beam at an analyte mass to charge ratio, transmitting at least a portion of the mass selected ion beam into the collision cell. See Eiden [091] col. 8 lines 25-67 and col. 9 lines 1-40. Although Eiden [091] does not specifically state that mass analyzing the beam at the analyte mass to charge ratio, it would have been obvious to one of ordinary skill in the art at the time the invention was made to analyze the beam at the analyte mass to charge ratio in order to see a spectrum of the ions of interest.

As per claim 14, Eiden [091] teaches the mass selecting being achieved by passing the ion beam through a first mass selective ion optical device (60,750). See Eiden [091] figs. 1,3-4, 7, col. 8 lines 25-67 and col. 9 lines 1-40.

As per claim 15, Eiden [091] teaches all aspects of the claim except for stating that the first mass selective ion optical device being located in a first evacuated chamber maintained at a high vacuum. It does however, teach the first vacuum chamber being maintained at a high vacuum. See Eiden [091] figs. 1,3-4, 7, col. 8 lines 1-40 and col. 10 lines 25-45. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to locate the first mass selective ion optical device in a first evacuated chamber in order to increase the amount of analyte ions entering the collision cell by rejecting the artifact ions in the beam.

As per claim 16, Eiden [091] teaches the collision cell being located in a second evacuation chamber operated at lower pressure than the first evacuated chamber and

the ion beam being contained in the second evacuated chamber by a second ion optical device. See Eiden [091] figs. 1,3-4, 7, col. 9 lines 1-40 and col. 10 lines 25-45.

As per claim 17, Eiden [091] teaches all aspects of the claim except for the first evacuated chamber being maintained at a pressure of approximately 10^{-2} to 10^{-4} mbar. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first evacuated chamber be maintained at a pressure of approximately 10^{-2} to 10^{-4} mbar, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

As per claim 18, Eiden [091] teaches all aspects of the claim except for the first evacuated chamber being maintained at a pressure of approximately 1-2 x 10^{-3} mbar. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first evacuated chamber be maintained at a pressure of approximately 1-2 x 10^{-4} mbar, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

As per claim 19, Eiden [091] teaches transmitting at least a portion of the ion beam, from the ion source through a sampling aperture (20) into an evacuated expansion chamber (15) along a first axis, into the first evacuated chamber through a second aperture, wherein transmitting at least a portion of the mass selected ion beam into the collision cell includes transmitting at least a portion of the ion beam into the second evacuated chamber (25) through a third aperture, and wherein a gap is maintained between the third aperture and an entrance aperture of the collision cell

(710). See Eiden [091] figs. 1,3-4, and 7. However, it does not specifically state that the gap be at least 2 cm. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the gap be at least 2 cm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

As per claim 20, Eiden [091] teaches a distance being maintained between the ion source and an entrance aperture of the collision cell. See Eiden [091] fig. 7 and col. 8 lines 25-67 and col. 9 lines 1-40. However, it does not specifically state that the distance maintained should be 90 to 200 cm. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a distance of 90 to 200 cm be maintained between the ion source and an entrance aperture of the collision cell, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

Claims 6,8-11,21-24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eiden [091] in view of Tanner [638]. As per claim 6, Eiden [091] teaches a method and apparatus comprising locating a mass-to-charge ratio analyzing means (10) in a third evacuated chamber (35) and being operated at lower pressure than the second evacuated chamber (25). See Eiden [091] fig. 7, col. 9 lines 1-40 and col. 10 lines 25-40. However, Eiden [091] does not specifically state the mass-to-charge ratio analyzing means being disposed along a second axis wherein the mass-to-charge ratio analyzing means includes a main filter, which preferably is an RF

quadrupole. Tanner [638] does teach the mass-to-charge ratio analyzing means (66) includes a main filter (64), which preferably is an RF quadrupole. See Tanner [638] abstract, fig. 1, and col. 3 lines 55-67 and col. 4 lines 1-40. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the mass-to-charge ration analyzing means include a main filter which preferably is an RF quadrupole in order to further filter out artifact ions coming out of the collision cell in order to obtain a better spectrum of analyte ions. In addition it would have been obvious to use an RF quadrupole to aid in the filtering since it was know in the art that RF quadrupoles are used for filtering and guiding ions. With regards to the mass-to-charge ratio analyzing means being located along a second axis, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the mass-to-charge ratio analyzing means be located along a second axis, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claim 21, Eiden [091] teaches all aspects of the claim except for specifically stating that the mass analyzer be located in a third evacuated chamber operated at lower pressure than the second evacuated chamber, the mass analyzer being disposed along a second axis. Eiden [091] does however teach the mass analyzer (210) being located in a fourth evacuated chamber at about the same pressure as the third evacuated chamber, which is at a pressure which is less than the second evacuated chamber. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the mass analyzer be located in the

third evacuated chamber at a pressure which is less than that of the second evacuated chamber since the examiner takes offical notice of the equivalence of placing the mass analyzer in the third chamber to placing the mass analyzer in the fourth chamber since both chambers are at about the same pressure, for their use in the art of ion transfer due to pressure change and the selection of any of these known equivalents to transferring ions due to differences in pressure would be within the level of ordinary skill in the art. See Eiden [091] figs. 1,4,7 col. 9 lines 15-40, col. 10 lines 25-45, col. 12 lines 25-48. With respect to the applicant's claim about the mass analyzer being located along a second axis, the examiner would like to state that it is unclear from the claim exactly where this second axis is located and in which direction the axis faces. Therefore, it is the examiner's view that the mass analyzer is located along a second axis.

As per claims 8 and 22, Eiden [091] teaches the first mass selective ion optical device being an RF quadrupole. See Eiden [091] col. 8 lines 55-67.

As per claims 9 and 23, Eiden [091] teaches the second ion optical device being an RF quadrupole. See Eiden [091] fig. 7 and col. 15 lines 35-40.

As per claims 10 and 24, Eiden [091] teaches the second ion optical device being mass selective. See Eiden [091] col. 17 lines 10-25.

As per claims 11 and 26, Eiden [091] teaches all aspect of the claim except for the second axis being offset from the first axis. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the second

axis being offset from the first axis, since it has been held that rearranging parts of an invention involves only routine skill in the art.

Claims 12 and 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eiden [091] in view of Okamoto [739]. Eiden [091] teaches all aspects of the claim except for specifically stating that the first evacuated chamber is divided into a first region adjacent to the expansion chamber containing an extractor lens driven at a negative potential, and a second region adjacent to the collision cell, by a larger diameter aperture and the aperture being sealable by means of a flat plate on an O-ring seal. Okamoto [739] teaches the first evacuated chamber being divided into a first region adjacent to the expansion chamber containing an extractor lens (90) driven by a negative potential and a second region adjacent to the collision cell by a large diameter aperture and the aperture being sealable. See Okamoto [739] fig. 3 and col. 3 lines 10-30 and 45-65. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use have the first evacuated chamber being divided into a first region adjacent to the expansion chamber containing an extractor lens (90) driven by a negative potential and a second region adjacent to the collision cell by a large diameter aperture and the aperture being sealable in order to extract ion from the ion source and keep artifacts from entering the collision cell. With regard to the applicants' claim that the aperture is sealable by means of a flat plate on an O-ring seal, it is well known that O-rings are used to aid in the creating air/fluid type seals. In addition, it is obvious that a flat plate placed adjacent a hole that has a circular and planar configuration would seal a hole in a vacuum chamber due to the vacuum.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eiden [091]. As per claim 27, Eiden [091] teaches a mass spectrometer comprising an ion source for generating an ion beam from a sample introduced into a plasma, an ion optical device (750) disposed to receive at least a portion of an ion beam generated by the ion source, the ion optical device (750) being configured to mass select at least a portion of the ion beam generated by the ion source at a mass-to-charge ratio, a collision cell (710) disposed to receive at least a portion of a mass selected ion beam from the ion optical device (750), and a mass analyzer (10) disposed to receive at least a portion of the mass selected ion beam from the collision cell (750). See Eiden [091] fig. 7, col. 15 lines 15-40, col. 17 lines 60-67, and col. 18 lines 1-5. However, Eiden [091] does not specifically state that the mass analyzer be configured to mass analyze the received ion beam at the mass-to-charge ratio. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the mass analyzer be configured to mass analyze the received ion beam at the mass-to-charge ratio in order to observe a spectrum of the analyte ions.

Response to Arguments

Applicant's arguments filed 3/25/03 have been fully considered but they are not persuasive. With respect to the applicant's argument that Eiden [091] does not teach performing a mass selection step before the beam enters the collision cell or ion trap, the examiner would like to draw the applicant's attention to fig. 7 of Eiden [091] where it

is clearly shown that the ion beam goes through the discriminating unit (750) before it reaches the collision cell (710).

As to the applicant's argument that Eiden [091] does not recognize the benefit of the preliminary mass selection step, the examiner would like to draw the applicant's attention to col. 1 lines 30-50, col. 7 lines 25-40, col. 8 lines 35-67, col. 9 lines 1-40. Here, Eiden [091] teaches that the collision cell can be located after the lens stack (which can function as a discriminating unit). In addition, it teaches that it is important to discriminate the ions in order prevent artifacts from entering the mass analyzer or collision cell.

As to the applicant's claim that Eiden [091] does not teach the mass analysis not being performed at the same mass-to-charge ratio as the initial mass selection step. The examiner again states that it would have been obvious to perform the mass analysis at the same mass-to-charge ratio as the initial mass selection step since it is the analyte ions, which are to be analyzed as taught in Eiden [091]. See Eiden [091] col. 5 lines 20-25. Therefore it would have been obvious to have the mass analysis be performed at the same mass-to-charge ratio as the initial mass selection since by selecting the analyte ions based on their mass-to-charge ratio, one is able to lower the number of contaminants and therefore insure that a higher number of analyte ions are transferred to the mass analyzer than the number of artifacts and contaminants. By doing this one is able to obtain a spectrum of the ions of interest, without analyzing the contaminant and therefore obtaining a clearer spectrum.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (703)-308-6555. The examiner can normally be reached on M-F from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee, can be reached on (703)-308-4116. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.

A. Quash 6/15/03